Interpretation of the Electrical Safety Committee – March 2008

Non- Electric Utility Type Cables with a Grounded Shield Operating above 300 Volts are not Exposed Live Parts.

Summary

This Interpretation does not apply to shielded cables or conductors that are considered electric utility and distribution equipment.

Insulated conductors or bus bars operating at or below 300 Volts to ground are specifically identified as not being considered live parts as per 29 CFR 1910.303(h)(3) table S-2. The implication is that insulated cables and bus bar operating above 300 volts are live parts. In OSHA 1910.399 Definitions: an insulated conductor is defined as: "A conductor encased within material of composition and thickness that is recognized by this subpart as insulation". Shielded cables have an additional conductive layer enclosing the insulating layer, and when properly grounded, the shield presents an effective ground plane preventing contact with any non- zero electrical potential. A shielded conductor with properly grounded outer shield operating above 300 Volts to ground is not equivalent to an insulated conductor and should not be considered an exposed live part. For the purposes of 1910.303(h) (General requirements for equipment operating above 600 Volts) the properly grounded outer shield of a cable shall be considered a metallic enclosure which adequately prevents accidental contact with a live part.

Relevant Codes Sections

OSHA 1910.308(a) *Systems over 600 volts, nominal*. This paragraph covers the general requirements for all circuits and equipment operated at over 600 volts.

1910.308(a)(1)(i)

Aboveground conductors shall be installed in rigid metal conduit, in intermediate metal conduit, in electrical metallic tubing, in rigid nonmetallic conduit, in cable trays, as busways, as cablebus, in other identified raceways, or as open runs of metal-clad cable suitable for the use and purpose. In locations accessible to qualified persons only, open runs of Type MV cables, bare conductors, and bare busbars are also permitted. Busbars shall be either copper or aluminum. Open runs of insulated wires and cables having a bare lead sheath or a braided outer covering shall be supported in a manner designed to prevent physical damage to the braid or sheath.

LESC Comment: This paragraph allows open runs of braided cables operating above 600 Volts.

1910.308(a)(3)(ii)

Metallic shielding components such as tapes, wires, or braids, or combinations thereof, and their associated conducting and semiconducting components shall be grounded.

1910.308(a)(5)(v)
Suitable barriers or enclosures shall be provided to prevent contact with non-shielded cables or energized parts of oil-filled cutouts.

1910.308(e)(4)(iii)
Transmitters shall be enclosed in a metal frame or grill or separated from the operating space by a barrier, all metallic parts of which are effectively connected to ground. All external metal handles and controls accessible to the operating personnel shall be effectively grounded. Unpowered equipment and enclosures are considered to be grounded where connected to an attached coaxial cable with an effectively grounded metallic shield.

LESC Comment: This paragraph clearly defines the metallic sheath of a coaxial cable as being an effective ground.

M Supplement 1
Definitions: Electrical Standard Number: 1910.399

"Guarded." Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach to a point of danger or contact by persons or objects.

LESC Comment: A grounded shield prevents contact with any dangerous electrical potential. Therefore shielded cable with a properly ground shield is considered properly guarded.

"Enclosed." Surrounded by a case, housing, fence, or walls that will prevent persons from accidentally contacting energized parts.

LESC Comment: A grounded shield prevents accidental contact with an energized part. A properly grounded shield is a grounded enclosure.

"Exposed." (As applied to live parts.) Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts not suitably guarded, isolated, or insulated.

LESC Comment: A cable with a properly grounded outer shield is not and exposed live part.

“Grounded, effectively.” Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the buildup of voltages that may result in undue hazards to connected equipment or to persons.

Discussion / Analysis

OSHA has given a very specific definition of what an insulated conductor is and it is clearly different than a shielded cable. OSHA allows the free running of coaxial cable above 600 volts, if the shield is properly grounded. OSHA allows the shield of a coaxial cable to act as a ground for other unenergized components such as equipment housings. If the outer shield of a cable is properly grounded it prevents the buildup of voltages that may result in undue hazards to connected equipment or to persons. A properly shielded cable meets the definition of “Guarded” and “Enclosed” and does not meet the definition of “Exposed”. An insulated conductor without a grounded outer shield is neither “Guarded” nor “Enclosed” and should be considered a live part, if operating at or above 300 Volts to ground.